INRIA

Project-Team Scilab

Equipe opérationnelle du consortium Scilab

Paris - Rocquencourt

THEME NUM

Activity Report

2007

Table of contents

1. Team

Head of project team
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Administrative assistant
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Staff member
Serge Steer [DR, Inria, part time, HdR]

Technical staff
Allan Cornet [since July 01 2003]
Vincent Couvert [since March 01 2007]
Didier Halgand [since December 15 2004]
Bruno Jofret [since November 1 2006]
Sylvestre Ledru [since June 15 2006]
Simone Mannori [since September 01 2007]
Pierre Maréchal [since September 01 2004]
Hugues Perdereau [left December 31 2007]
Jean-Baptiste Silvy [since October 15 2005]
Laurent Vaylet [since December 01 2007]

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2. Overall Objectives

2.1. Overall Objectives

Scilab is a scientific software platform for numerical computation providing a powerful open computing environment for engineering and scientific applications.

Scilab is an open source software. Since 1994 it has been distributed freely along with the source code via the Internet. It is currently used in educational and industrial environments around the world. Scilab is produced by the Scilab Consortium, launched in May 2003. The Scilab Consortium has to date 25 members.

Scilab project is not a "research-project team" but a "development-project team" at INRIA Paris-Rocquencourt Research Centre. It is the operational team of Scilab Consortium.

Scilab includes hundreds of mathematical functions with the possibility to add interactively programs from various languages (Fortran, C, C++, ...). It has sophisticated data structures (including lists, polynomials, rational functions, linear systems...), an interpreter and a high level programming language.

Scilab has been conceived to be an open system where the user can define new data types and operations on these data types by overloading operators.

A number of toolboxes are available with the system:

- 2-D and 3-D graphics, animation.
- Linear algebra, sparse matrices.
- Polynomials and rational functions.
- Interpolation, approximation.
- Simulation: explicit and implicit systems of differential equations solvers.
- Scicos: hybrid dynamic systems modeler and simulator.

- Classic and robust control, LMI optimization.
- Differentiable and non-differentiable optimization.
- Signal processing.
- Graphs and networks.
- Parallel Scilab.
- Statistics.
- Interfaces with Computer Algebra (Maple).
- Interface with Fortran, Tcl/Tk, C, C++, java, LabVIEW.

A great number of contributions for various domains are available from Scilab Web site.

Scilab works on most UNIX systems including GNU/Linux and on Windows 9X/2000/XP/Vista. Binary versions for these systems are freely available, along with source code.

Web Site

Newsgroup: `comp.soft-sys.math.scilab`

Contact: `com@scilab.org`

3. Scientific Foundations

3.1. Scilab Consortium

Scilab Consortium was created in May 2003. Today there are 25 members: ANAGRAM TECHNOLOGIES, APPEDGE, ARTENUM, ATMEL ROMA, AXS INGENIERIE, CEA, CNES, DASSAULT AVIATION, ECOLE CENTRALE DE PARIS, ECOLE POLYTECHNIQUE, EADS, EDF, ENGNET, ENPC, ESTEREL TECHNOLOGIES, IFP, INRIA, KLIPPEL, MANDRIVA, PSA PEUGEOT CITROEN, RENAULT, SCALEO CHIP, STYREL TECHNOLOGIES, THALES and TNI.

There are also 7 contributor members: they are natural persons who made important contributions to Scilab and who were accepted by the steering committee of the consortium.

The purpose of Scilab Consortium is:

- To organize cooperation and exchange within the community of developers in order to make Scilab a platform which integrates the latest scientific advances in the field of numerical computation.
- To organize cooperation and exchange within the community of users in order to make Scilab a product that meets specifications required for use in industrial, educational and research environments.
- To obtain the resources necessary to maintain a team committed to editing new versions of the software which meets specified standards, encouraging the community of developers and ensuring first level support for users.

The Consortium is chaired by Doctor Maurice Robin, director of Digiteo Research Park.

The main parts of the Consortium are:

- The *Conference of Participants* elects the persons taking part to the Steering Committee and to the Scientific Board and decides any other matter proposed for the agenda by the Steering Committee. The participants can take part to working groups. The purpose of working groups is to help and prepare the decisions of the steering committee. There was a working group about Scilab kernel in 2007.
- The *Steering Committee* is the decision-making body representing the Consortium's Conference of Participants.
- The *Scientific Board* analyses the scientific value of contributions and previews the scientific value of developments to be carried out.
- The *Operational Team* described below.

3.2. Operational Team

The Operational Team implements the decisions of the Consortium about Scilab development and promotion. It is the "Scilab development team" at INRIA Paris-Rocquencourt Research Center.

The team is organized as follows:

- The Chief Technology Officer of Scilab Consortium who manages the operational team: Claude Gomez.

- The Promotion and Marketing Manager who is responsible for promoting the software, recruiting new members, conducting communications and promotional activities and communicating the users' needs: Didier Halgand.

- The Scientific Manager who is in charge of the scientific parts of the project: Serge Steer.

- The Quality Assurance Manager who monitors and enhances quality assurance processes used in development and maintenance of Scilab: Hugues Perdereau.

- The Scilab 5 manager who is in charge of the development team management and the schedule for Scilab 5 next releases: Vincent Couvert.

  The Development Team, tasked with developing or delegating the development of new functions or enhancement of existing features and to compile and distribute subsequent versions of the Scilab software. It does also maintenance and support. At the end of 2007 it is compound by:

  - Alan Cornet.
  - Bruno Jofret.
  - Simone Mannori
  - Pierre Maréchal.
  - Sylvestre Ledru.
  - Jean-Baptiste Silvy.
  - Laurent Vaylet.

3.3. Scilab Developers

They are people who can modify Scilab code directly, add functionalities and fix bugs. They work in accordance with Scilab team, under the management of the Scilab 5 manager.

In particular, Scipad, the Scilab editor, is developed by external Scilab developers (see below).

There are currently 16 Scilab developers.

4. Software

4.1. New Scilab release

First of all, Scilab 4.1.1 was released in April 2007 for two main reasons:

- to have a HP-UX release available for Scilab users
- to provide a Scilab version running with the Scilab - LabVIEW Gateway release 1.0

Then, Scilab 4.1.2 was released at the end of October to update both Scicos and Scipad.

Scicos is developed by Scicos team in the METALAU research-project team at INRIA Paris-Rocquencourt Research Centre. The main improvements they made for Scicos 4.2 included in Scilab 4.1.2 are:

- Scicos Editor:
    – Windows style editing: basic operations implemented.
    – Multi-diagram editing: for example copy and paste from any window to any other.
    – Documentation: fairly complete on-line help and supporting documentation.
    – Active Scilab prompt: menu activated.
    – Undo operation: one step per window.
    – Diagram browser: a much nicer replacement for the old navigator.
    – From/To workspace blocks: support vector Scilab variables of various types but not matrices.
    – Palette operations: New Palette browser.
    – Palettes: enriched Palettes of elementary blocks (Modelica blocks, Matrix operation blocks, Integer operation blocks).
    – Modelica blocks: on-line Modelica code editing and more.
    – Inspection of available parameters: available in every window.
    – Block Masking: create, delete, customize, and save Block GUI.
    – From/Goto blocks: available in every sub-system.
    – Block/Diagram data inspection: Details menu.
    – General data types

- Scicos Compiler:
    – New compiler algorithm: fixing some errors.
    – Support for extended data types.
    – Improved error message handling.
    – Implicitly defined multi-frequency event clocks.

- Scicos Simulator:
    – Use of the numerical solvers of SUNDIALS.
    – Support for extended data types.
    – Improved error message handling.
    – Scope graphics based on Scilab's new graphics library: possible to edit simulation results a posteriori.

- Scicos Code generator:
    – New algorithm adapted to the new compiler: avoids recursive calls.
    – Support for extended data types.

Scipad Editor is developed by external developers Franois Vogel and Enrico Segre. Major improvements for Scilab 4.1.2 are:

- A lot of bugs were corrected
- Step-by-step debugging available, with step into, step over, and step out
- Debugging of Scilab scripts
- Scilab errors trapping during the debug
- Automatic watch of variables and evaluation of arbitrary expressions during debug
- Column mode block selection, cut/copy/paste/drag'n'drop
- Performance improvements in many areas, especially in colorizing files
- Robustness of the Scilab/Scipad interface increased
- Many small improvements in Find/Replace
- Overall look and feel and ergonomics improved

4.2. Scilab Development

The Scilab developement is based on a management plan and a quality policy. We describe below :

- The management plan.
- The quality assurance plan.
- The bug tracking policy.
- The qualification procedure and the qualification environment.

The management plan A management plan has been written and diffused to the Steering Committee of the Consortium. This document gives the general rules that the operational team sets up for the realization of the development of Scilab software within Consortium framework.

- Operational organization and regular check (team organization, responsabilities, meetings, etc.).
- Road map proposal (calendar and dead-line).

The quality assurance plan This document gives the general rules that the operational team sets up for the management, the development, the qualification, the diffusion and the maintenance of Scilab software.

- Quality plan (organization and follow-up).
- Cross procedures to the Scilab activity (documentation management and configuration management).
- Qualification procedure (process, referential, non-regression and implementation).
- Management procedure of the technical requests (bugs management, means, etc.).

The bug tracking policy The choosen policy is to have a complete tracability of all the Scilab bugs and requests. In order to respect the policy, an open source tool (Bugzilla) has been modified and installed to manage and track the Scilab bugs and the Scilab requests (see below the description of the bug tracking system).

The qualification procedure and the qualification environment Scilab team has defined and installed a qualification procedure and related environment to ensure the internal acceptance of the scilab software.

This procedure is based upon a reference scale of qualification. Each step of this scale is composed of critical elements and information elements:

- critical elements generally correspond to tests which must be successfully passed to achieve acceptance,
- information elements correspond to others tests, documentation checking, etc.

This provides not only criteria for classical acceptance but also thorough information on the final state of the scilab product version to be described in "released notes" document as well as known by support team prior to external delivery.

The used methodology should be an answer to the constraint of a software product:

- large diffusion
- heterogenous target machines
- regular delivery (major or minor releases)

4.3. Technical support

- Technical support daily activities
    - Answering emails coming from Scilab users and forwarding the emails to the Scilab experts in case of specialized problem.
    - Managing the web server.
    - Managing the ticket manager (OTRS) and differents mailing-lists.
    - Managing the bugzilla system and the bug assignation.
    - Administrating the Subversion server, managing projects, users and accesses.
- Automatic compilation chain

    To test every day the compilation of Scilab sources provided by our Subversion server, an automatic compilation chain has been installed. It starts every night on various platforms (GNU/Linux, Windows, Solaris and HP UX).

    This compilation chain has three main tasks:
    - Compile Scilab SVN sources.
    - Produce a daily version of scilab on different platforms and different branches of SVN tree.
    - Launch various test batteries.
        * unitary tests
        * non-regression tests
        * benchmarks
        * code style, code syntax
        * ...

    This process is very important for debugging Scilab when source code is modified. Moreover it allows the team to release such called "nightly builds" every day: these versions are not fully qualified but they allow the users to benefit from the last developments and bugs fixing.
- Scilab Website
    - Scilab website http://www.scilab.org is updated regularly. This web site is also a good pathway to be in contact and get feedback from Scilab users. So, a guestbook and a form allows internet surfers to make requests. A web site traffic analysis and statistics tool has been installed. More than 80 thousand different net surfers visit each month http://www.scilab.org and Scilab has been downloaded 350,000 times this year from the website.
- Scilab Intranet
    - We increase and update regularly our intranet website to share and give technical data and general information to the whole Scilab team.
- Bugzilla: a bug tracking system for Scilab In addition to Scilab newsgroup, providing a wealthy Scilab software knowledge database, the Scilab development team proposes on Scilab website the Scilab bugs tracking system, a bugzilla-based system. It is a centralized web-database tracking system for Scilab bugs and Scilab requests. This tool allows to share and take advantage of the experiment of the Scilab community (developers and users). Each user, after creating an account, can:
    - create a new bug report or a new request,
    - give an attached file reproducing the defect and/or advising a workaround,

– make a search in the bugs database or requests database,

– find an existing patch for a registered bug.

- Scilab developers Subversion source code and Bugzilla management have been open to the Scilab Developers. Decicaded Web pages have been made for them with all the information needed for coordinating the development. Now, this area is a real collaborative development environment: it provides a front-end to a range of software development lifecycle services and integrates with a number of free software applications:

    – forum: phpBB,

    – wiki: MoinMoin,

    – Subversion repository Viewer: ViewVC,

    – bug Tracking: Bugzilla.

    – mailing list: `svn@lists.scilab.org`.

- Ticket management: Now Scilab users can contact us with the following email addresses:

    – scilab.support@scilab.org

    – scicos.support@scilab.org

    – com@scilab.org

    – webmaster@scilab.org

    All messages sent to these addresses are now managed with an open-source ticket manager: OTRS.

    In order to facilitate the communication around Scilab, we opened two public mailing lists:

    – `users@lists.scilab.org`: main mailing lists for all usage questions about Scilab software.

    – `dev@lists.scilab.org`: medium volume list for those who want to help out with the development of Scilab.

4.4. Linux Version

- Configure adapted to many architectures.

- New compilation system under GNU/Linux and Unix: The Scilab compilation process under Unix and Unix like platforms was old and outdated. For each architecture and compiler, an important work was needed to investigate options and flags in order to produce binaries and libraries of Scilab. Thanks to the autotools (automake, autoconf and libtool), these problems are automaticaly managed and the maintenance is considerably simplified. We rewrited all the compilation process of Scilab with the latest techniques available.

4.5. Vizualisation Module

Visualization module is one of the Scilab largest module. It allows to represent data using many kind of visualization items such as curves, surfaces, vector fields,...

The module is currently composed of two sub modules. The first one deals with graphics syntax and internal representation of graphics data. The second is dedicated to the rendering process which produces graphics on the user's screen or in graphics files.

Until Scilab 2.7 Scilab graphics used an old syntax and data representation. It was quite powerful but users complained in particular about the graphics functions syntax and the poor customization tools available.

Then from Scilab 2.7 to Scilab 4.1.2 we added a new graphics mode to the syntax sub module. The new graphics mode is now more powerful in terms of efficiency, stability, and ergonomics. However, until relaese 4.1.2 we maintained both mode in order to give user time to change from the old one to the new one. Now, after 4 years with both graphics modes, we decided to remove the old graphics version from the 5.0 release. Consequently this year we had to remove the old mode from Scilab code, demonstrations, documentation and test and update them. We also had to fix the last remaining bugs in order to provide a very stable version. We can say now that new graphics mode reaches maturity.

In parallel, we began the rewritting of the rendering sub module. This represents the major work on visualization module this year. Until Scilab 4.1.2, we used two old, non portable, and 2-D dedicated API's to display plotted data. One API was for Windows platforms and the other for Unix/Linux platforms. After testing between several graphics API, we decided to use the OpenGL API to replace the previous ones. It is a widely used API in Scientific Visualization. It is portable, dedicated to 3-D and faster since hardware is accelerated. Moreover, as we also decided to use Java technology for Scilab 5.0, we chose the JoGL API, the Java binding for the OpenGL API. Consequently, we can easily integrate the sub module into the new Java GUI and use the capabilities of Java language. We are now using Object Oriented programming and design patterns for developments. Graphics code is now much clearer, only weakly linked with rendering API and ready for new extension and improvement.

For Scilab user, using this new technologies, we are now able to provide new functionalities. We can now have true type fonts and 3-D clipping. Moreover there is no longer mistakes with 3-D faces ordering since OpenGL uses Z-buffer technology.

4.6. Reorganization and modularity

Since the beginning of Scilab Consortim in 2003, we improved Scilab from version 2.7 to version 4.1.2 in order to have a professional software. But we think that Scilab 4.1.2 is the last one of an old family dating back to the 80's. So we are working on a brand new Scilab family starting with Scilab 5.0. In this new family, compatible with old Scilab, modularization, new GUI, new graphics rendering and new kernel will be available. The huge corresponding work began in 2007.

Reorganization and cleaning of the code for Scilab 5.x started.

- Reorganization and modularity:
    - To allow independent development of each Scilab component together with improvement and fixing via patches.
    - To give a genuine interoperability to the Scilab kernel and components from external programs and modules.

- Implementation of dynamic libraries:
    - To ease improvement and fixing via patches.

4.7. Localization

Scilab 5.0 will be multilanguage. We based our development on the GNU localization system, `gettext`. All Scilab messages will be available in various languages. An important work has been done to normalize standard and error messages. We are also providing tools for users to localize their toolboxes. Next version will be available (at least) in English and French.

4.8. User Interface

Scilab GUI has been rewritten using Java to get the same GUI under all Scilab supported platforms. This development deals not only with Scilab graphics windows but also with Scilab console and "uicontrols" (user defined objects in GUI) that can now be included in the same windows than Scilab graphics windows: this is one of the main Scilab users requests.

4.9. Windows Version

A lot of improvements have been done to Scilab Windows version for Scilab 5.0 release:

- Visual Studio .NET 2005 is used as Integrated Development Environment.
- Scilab Windows versions built with Intel C and Fortran Compilers 10.
- Visual studio 2005 solution has been redefined to support modularity and dynamic libraries.
- Visual Studio .NET 2005 Express Edition (free) is also supported by Scilab Team to build Scilab.
- Integration of the ATLAS 3.8 library.
- Integration of FFTW 3.1 library.
- Integration of the Intel Math Kernel 10 library.
- Preparation for Scilab to support Windows x64.
- Better integration to Vista (UAC).

4.10. Strings management

In Scilab 4.x, strings primitives were written in fortran. Wu Cong (internship) rewrote in C language and updated strings management routines. Scilab 5.0 now manages regular expressions using PCRE library.

4.11. European projet : hArtes

Scilab takes part in a European project named "hArtes" funded by FP6 call5 Embedded Systems. hArtes aims to lay the foundation for a new holistic (end-to-end) approach for complex real-time embedded system design, with the latest algorithm exploration tools and reconfigurable hardware technologies. The proposed approach will address, for the first time, optimal and rapid design of embedded systems from high-level descriptions, targeting a combination of embedded processors, digital signal processing and reconfigurable hardware.

hArtes will develop modular and scalable hardware platforms that can be reused and re-targeted by the tool chain to produce optimized real-time embedded products. The results will be evaluated using advanced audio and video systems that support next-generation communication and entertainment facilities, such as immersive audio and mobile video processing.

Scilab will be used as an input of this chain as high level algorithm description language. For this purpose we are going to generate C code from scilab scripts.

After one year of project and the European commission review, we could say that hArtes, and Scilab within it, are on the right way. We are having great cooperation with the project partners and taking opportunities to have contributions that increase Scilab skills in embedded systems.

Scilab to C code generator [sci2C]:

The aim of this toolbox is to allow users generate their own standalone C Code from Scilab scripts. The C code will be generated for General Purpose Processors but will enlarge in order to fit specific processors like DSP used in hArtes.

The aim is to generated minimal standalone C code that only include libraries it really needs. Then this code will be able to be executed independently of Scilab or embedded in processors, giving independance and efficiency. This is a major improvement for Numerical Computation Packages.

4.12. Scicos Testing/Industrialization

During the two months preceding the release of Scilab 4.1.2 we have supported METALAU during the integration, testing and bug fixing of the latest official Scicos version.

4.13. Scicos for embedded systems

We have updated most of the Scicos toolboxes for real time embedded systems to the latest Scicos version:

- Scicos-HDL: the Chinese development team (Zhang Dong and Kang Cai) spent three weeks in Scilab for the update and the evolution of their toolbox (FPGA/CPLD Scicos-integrated simulation and code generation). They updated almost all the package, from the user interface to the simulation functions. We have integrated the Scicos internal compiler with the Scicos-HDL code generator and we have extended the simulation capability using the GHDL external compiler.

- Scicos-HIL: the package has been updated and extended to Linux hard real time using RT_PREEMPT.

- Scicos-FLEX: we have written from scratch a brand new serie of Scicos palettes of blocks that can be used effectively for simulation and code generation. The simulation functions of these blocks support the new Scicos data types. The code generator has been modified to be more effective for embedded systems development and for an optimal integration with real time operating systems. This work is done in close collaboration with Roberto Bucher (SUPSI, Lugano) and Paolo Gai (Evidence).

4.14. Other Developments and Support

- Connecting LabVIEW with Scilab [Release 1.0].
    – The interface between Scilab and LabVIEW is provided through a Scilab script node. So you can include text-based Scilab programming (Scilab macro language) in Virtual Instruments you create with LabVIEW.

- Licence investigations:
    – Scilab is a patchwork of various scientific/IT works. During the last few years, free and open source software are becoming more and more important. As licences are one of the key of this revolution, it is crucial to have a clear vision of Scilab embedded sources. Each file has been inspected and the licence evaluated. When the licence was not INRIA, an evaluation of the compatibility of the licence has been made.

4.15. Marketing

2007 has been mainly devoted to the development of the transition plan from the phase 1 to the phase 2 of the Scilab Consortium (strengthened organization). Implementation of phase 2 is expected by mid-2008, according to the plan submitted to both the Steering Committee of the Consortium and INRIA?s authorities. For that a Scilab Task Force has been organized at INRIA to prepare for the setting up of new Scilab Consortium.

Besides, the product development and promotional activities are remained strong and the number of downloads increased from an average of 23,000 units per month during the first quarter of 2007 to an average of 44,000 units per month for the last quarter with a peak of 49,388 units reached in October.

Among the major developments in 2007, the partnership started with National Instruments (NI) illustrates the increasing of Scilab awareness and notoriety internationally. The partnership already provided a gateway between Scilab and LabVIEW. Announced on May 9, the gateway has, at present, been distributed more than 4,000 times by NI, what makes it the second more distributed product in its class.

From a quantitative viewpoint, the marketing activity in 2007 has been comparable to the one of 2006 in spite of the working overload caused by the management of the on-going transition process:

- Scilab has been exhibited at 5 major national and international events.
- Numerous formal presentations of Scilab to large organizations or companies have been delivered.
- Numerous business meetings took place with potential consortium members and users to sustain Scilab awareness and use.

Finally 2007 can be perceived as a transition year to pave the way towards a reinforced Scilab Consortium better equipped to address numerical calculation and simulation markets expectations. A step towards positioning Scilab as a privileged numerical calculation platform in selected areas has been accomplished.

5. Contracts and Grants with Industry

5.1. Contracts and Grants with Industry

Scilab Consortium After INRIA funding, the main funding of Scilab development-project team comes from the dues given by the members who subscribe to Scilab Consortium.

National Instruments Participation to the Numerical Mathematics Consortium and for making the Scilab LabVIEW gateway.

THALES Air Defence Work in collaboration with OASIS research-project team at INRIA Sophia Antipolis - Méditerranée Research Centre about the parallelization of Scilab/Scicos simulations with ProActive.

6. Other Grants and Activities

6.1. Consortium

- Claude Gomez and Didier Halgand: steering committee, 14 March 2007.
- Claude Gomez and Didier Halgand: steering committee, 13 June 2007.
- Claude Gomez and Didier Halgand: steering committee, 20 September 2007.
- Claude Gomez and Didier Halgand: assembly of Consortium participants, 20 September 2007.

6.2. National Actions

We had two important actions in the competitiveness cluster SYSTEM@TIC:

- Validation and funding of the "EPHOC" project, a high performance environment for optimization and conception, that will be launched at the beginning of 2008.
- Validation of the "Open HPC" project of which Scilab is one of the very key components. This project aims at developing and at supplying high performance free calculation tools and services on a HPC platform.

We are participating to 3 projects funded by the "Technologie Logicielles" program of ANR:

- OMD project, about multidisciplinary optimization, is based on Scilab platform. It will provide Scilab with a number of toolboxes for optimization. See http://omd.lri.fr. ANR encouraged all partners of this project to use Scilab and to develop toolboxes for Scilab. Some Scilab documentation have been written for this project, mainly to help partners to create toolboxes and to use optimization tools in Scilab.
- SCOS project, first generic Open Source platform for the global conception of complex systems in which Scilab is the numerical computation software used for this platform. See http://www.oscos. org/.
- OPUS project, an Open source Platform for Uncertainty treatment in Simulation, has just been accepted and will be launched at the beginning of 2008.

We also participated and had stands at the following manifestations:

- Salon Solutions Linux 2007, Paris, 30 January–1 February 2007.
- 2007 NI days, Paris, 7 February 2007.
- InterTICE 2007, Paris, 4 April 2007.
- Scicade 2007, Saint-Malo, 10-12 July 2007.

The French Ministry of Ecology, Sustainable Development and Town and Country Planning, advises, for research departments and for public construction and building sector, to employ Scilab to get used to the Eurocodes. See Scilab Eurocodes.

The Eurocodes are a new set of European structural design codes for building and civil engineering works.

Two days, 23 May and 26 September, were dedicated to the presentation and the experimentation of Scilab Eurocodes at the Ministry. Each time, about 100 people from Academic and Companies in public construction and building sector were present.

We also continue to promote Scilab in French high schools with the help of the "Académie de Versailles" and the "Inspection générale de mathématiques". A number of actions were made:

- We upgraded the Scilab documentation for mathematics professors and continue to manage a dedicated Web site. See lycée.
- We promoted the use of Scilab for the future "épreuve pratique de mathématiques" for the "baccalauréat" by showing how Scilab can be used to solve the corresponding problems. See épreuve pratique
- Claude Gomez. Calculer et visualiser avec le logiciel Scilab au lycée. InterTICE 2007, Paris, 4 April 2007.
- Claude Gomez. Le calcul numérique en mathématiques et le logiciel Scilab. Presentation for mathematics professors. Rocquencourt, 31 June 2007.
- Claude Gomez. Scilab presentation for high school at Académie de Paris, 21 November 2007 and Journées inter-académiques, 20 December 2007.

6.3. European Actions

We are participating to the hArtes project funded by FP6 call5 Embedded Systems. See above.

6.4. Numerical Mathematics Consortium

The creation of the "Numerical Mathematics Consortium" or NMC was announced In August 2005 in Austin (USA): NMC. INRIA, hosting Scilab Consortium, is one of the founding members with Maplesoft, National Instruments and PTC (formerly Mathsoft). The purpose of this consortium, open to everybody and working in the same way as the W3C, is the definition of the semantics of a set of mathematical functions for making numerical algorithms, mainly for matrix computations. The implementation of the algorithms is not taken into account and the syntax of the functions, only used for examples, is not imposed. The standardization should allow the interoperability of the software and the easy re-use of numerical algorithms. Standardization is one of the missions of INRIA who is strongly involved in the consortium.

We participate to the writing of the technical document. The work is organized around a weekly conference call and an annual meeting: this year we published the "Version 1.0 Draft Technical Specification (September 2007)" that can be found at Draft Technical Specification. which establishes basic concept definitions, as well as a first set of 60 function descriptions.

6.5. International Actions

- Claude Gomez and Serge Steer: organization and participation to the Indo-French Scilab Seminar/Workshops funded by CEFIPRA, IIT Bombay, Bombay, India, 6–9 March 2007.
- Claude Gomez: 2007 Scilab China Contest Awards Ceremony, Foshan, China, 11 May 2007.
- Claude Gomez: 2007 Scilab Japan Contest Awards Ceremony, Tokyo, Japan, 5 November 2007.

6.6. Visiting Scientists

Winners of 2007 China Scilab Contest: 3 Chinese students.

7. Dissemination

7.1. Scientific Committee Activities

- Claude Gomez: member of the executive committee of the "Technologies Logicielles" program of ANR.
- Claude Gomez: co-organizer of the 2007 International Workshop on Scilab Application and Open Source Technology (OSSS-EA'07), Foshan (China), May 11–12, 2007.

7.2. University Teaching

- Claude Gomez
  - Ecole Centrale de Paris, third year: Dynamical Systems.
  - Chaire X-THALES "Mastère Ingénierie des Systèmes Industriels Complexes": Dynamical Systems.
- Serge Steer
  - Chaire X-THALES "Mastère Ingénierie des Systèmes Industriels Complexes": Dynamical Systems.

7.3. Examination

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